EOSDIS IV&V Monthly Program Status Report

For the Period 11/1/94 to 11/30/94

(Deliverable 0201.5)

December 15, 1994

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INTERMETRICS

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1. PROGRAMMATIC INFORMATION

1.1 IV&V Project Organization Chart

Exhibit 1-1 illustrates the current organizational structure of the EOSDIS IV&V team. For each lead position, we have identified company affiliation, geographic location, phone

number, and task assignment. Also included is the number of full time equivalent engineers assigned to each technical task.

1.2 Overview of Work Being Performed

a) List of Active Task Assignments

- Task 1: IV&V Program Management
- Task 2: Facilities, Operations, and Program Reporting
- Task 3: IV&V Plans
- Task 4: IV&V Infrastructure and Tool Development
- Task 5: Requirements Analysis and Traceability
- Task 9: Key Interface Analysis
- Task 10: Development of EOSDIS Integration and Certification Plan
- Task 12: EDOS IV&V
- Task 13: IV&V Special Studies

b) Key Recent Accomplishments

• Programmatic

- Submitted self-evaluation of contract performance on November 15, 1994.
- Initiated Task 13, IV&V Special Studies, which will focus on V0 assessment and ETS monitoring. This task is currently in the process of being definitized.
- Participated in a working group discussion with Dale Harris, John Dalton, and other ESDIS system managers to review key IV&V findings related to the overall EOSDIS program. This discussion resulted in the establishment of a monthly review with ESDIS system management and the IV&V team.
- Conducted a demonstration of selected IV&V tools to the ESDIS Systems Engineering Manager. This demonstration proved helpful in addressing key systems engineering problems facing the ESDIS project in the areas of requirements management and interface control.

Exhibit 1-1: Org Chart (Landscape)

- Finalized arrangements for the installation of a 56KB data link between the Greenbelt office and GSFC. This line will be fully operational by the time we occupy our permanent offices on the second floor (i.e., December 16, 1994). The link will be upgraded to a T1 line, once we provide appropriate justification.

Technical

- Under Task 3, completed all updates to the IV&V Management Plan (IVVMP) and began incorporating Government comments to the draft Independent System V&V Plan (ISVVP).
- Under Task 4, developed a working outline for the ISE System Architecture document and hosted internal ISE architecture design review on November 16, 1994, to obtain IV&V Task Lead approval. Also, updated the Automated Requirements Database (ARDB) tool to accommodate interface requirement analysis activities, and continued developing the Interface Analysis Database (IADB) tool.
- Under Task 5, generated change pages to the Preliminary Requirements Analysis TAR, and began mapping user scenarios to ECS Level 3 requirements. Also, initiated ECS IR-1 requirements analysis effort by establishing analysis Excel/Word databases and obtaining an updated copy of the HAIS ECS RTM database.
- Under Task 9, completed the pilot Technical Analysis Report on the ECS-TRMM IRD, and delivered the Version 0 User Assessment. In addition, began data flow analysis of Institutional and AM-1 IRDs, and began requirements review of the MITI/Aster IRD and the Science Computing Facility IRD.
- Under Task 10, delivered the Tool Requirements Document one month ahead of schedule, and maintained active participation in working groups to ensure currency.
- Under Task 12, commented on the CUP TO 94-1 report and its revision. Also, presented our life cycle IV&V approach to the Test Oversight Group (TOG). In addition, supported the EOSDIS IV&V interface group in preparing its AM-1 test-related information.

c) New/Proposed Task Assignments

• None.

d) Follow-up on Action Items from October 17 PSR

1) Shade IV&V Milestone Chart to reflect activities already accomplished.

Action: Joe Gitelman, NASA; Ron Cariola, Intermetrics

Status: Done.

2) Contact Steve Smith to resolve the issue of accessing the ECOM requirements

database. Action: Joe Gitelman, NASA

Status: Open.

3) Provide cumulative expenditures for the program in numerical form.

Action: Pam McLaughlin, Intermetrics

Status: Done. Cumulative expenditures are now incorporated within this report.

4) Provide projections for program expenditures through September 1995.

Action: Ron Cariola / Pam McLaughlin, Intermetrics

Status: Currently being planned for submission with next 533Q report in December.

5) To justify a lowering of the personnel requirements (specifically with respect to Task 4), write a letter to Becky Ragusa describing the job, the minimum qualifications needed, and the cost savings associated with creating this new job category.

Action: Pam McLaughlin / Dan McCaugherty, Intermetrics

Status: Letter and revised labor categories submitted to NASA. Awaiting response.

6) Provide a quarterly and cumulative breakout of contract dollars (resulting from labor usage, equipment expenditures, etc.) flowing from this program to West Virginia. Include this information with the submission of the 533Q report.

Action: Pam McLaughlin, Intermetrics

Status: Data currently being gathered. Will request clarification on this item to ensure compliance.

1.3 Overview of Schedule Status

Exhibit 1-2 presents the latest, high level milestone chart (i.e., dated December 1, 1994) for all technical tasks assigned on the EOSDIS IV&V contract. In conjunction with this exhibit, Exhibit 1-3 lists in chronological order all deliverables/milestones associated with the contract and the status of each.

Exhibit 1-2: Gitelman Milestone Chart (Landscape Paste-up)

Date	Milestone/	Task	Status*	Comments
Due	Deliverable	#		
7/8/94	ECS Release A SDR IV&V RIDs	5	С	Accomplished within 17 days of
				contract award.
7/8/94	SDR IRD RID Package	9	C	Accomplished within 17 days of
				contract award.
7/15/94	M1 Requirements and Architecture	4	С	Submitted on time.
8/16/94	IV&V Management Plan - Draft	3	С	Submitted ahead of schedule.
8/16/94	M1 Initial Tool Architecture Review	4	С	Conducted ahead of schedule.
8/30/94	ISE System Requirements - Draft	4	С	Submitted on time.
10/7/94	EOSDIS Modeling Assessment Report	5	C	Submitted on time.
	(User Demographics)			
10/17/94	ISVVP - Initial	3	С	Submitted on 10/18/94.
10/17/94	Certification Criteria Determination	10	C	Submitted on time.
10/10/04	Report - Initial			
10/18/94	M1 Demonstration	4	C	Conducted on schedule.
10/28/94	Preliminary ECS Rqmts Analysis Report	5	C	Submitted on time.
10/31/94	ISE System Requirements - Update	4	С	Submitted on time.
10/31/94	Version 0 User Assessment	9	C	Submitted on time.
11/30/94	CUP Study Report (Studies: 1-4, 6)	12	C	Submitted on time.
12/1/94	ECS-TRMM IRD Pilot TAR	9	C	Submitted on time.
12/16/94	IV&V Management Plan - Final	3	IP IP	Ahead of schedule.
12/16/94	ISVVP - Update	3	IP IP	On schedule.
12/16/94	ISE System Architecture - Draft	4	IP O	On schedule.
12/16/94	ECS Release A PDR IV&V RIDs	5	0	
12/16/94	Performance Dependency Analysis Tool	10	C	Submitted one month ahead of
12/16/94	Requirements EICP - Initial	10	IP	schedule.
		10 5		On schedule.
12/30/94	Initial ARDB	3	IP	Initial database development is on schedule. Updates needed
				after requirements stabilize.
12/30/94	EOSDIS Modeling Assessment Report	5	IP	On schedule.
12/30/94	Baseline Rqmts. Analysis Report	12	0	On schedule.
12/30/94	SCR RIDs	12	0	
1/16/95	ISE System Architecture Review	4	IP	Planned for 1/13/94, ahead of
1/10/75	ISE System Memberture Review	-	11	schedule.
1/16/95	ECS Release A PDR RIDs	9	О	Serieusie
1/31/95	ISE System Architecture - Update	4	0	
1/31/95	ISE Development Plan - Draft	4	0	
1/31/95	CUP Study Report (Studies: 5, 7-10)	12	0	
2/16/95	M1 Revision 2 Demo	4	0	
2/28/95	ISE Development Plan - Final	4	0	
3/1/95	Initial ARDB for IRD Requirements	9	0	
3/16/95	ECS Interim Rel 1 Rqts Analysis Report	5	0	
3/16/95	ISE Element Requirements - Draft	4	0	

^{*} C = Completed, IP = In Process, O = Open, D = Delayed, CX = Canceled

EXHIBIT 1-3: Status of Milestones/Deliverables

Date	Milestone/	Task	Status*	Comments
Due	Deliverable	#		
4/17/95	ISE Element Requirements - Update	4	O	
4/28/95	SRR RIDs	12	O	
5/16/95	ISE Element Software Design - Draft	4	O	
5/31/95	ISE System Design Review	4	O	
5/31/95	Acceptance Test Plan - Preliminary	12	О	
6/15/95	Certification Criteria Determination Report - Update	10	0	
6/15/95	EICP - Final	10	0	
9/30/95	Draft Release IR-1 Test Plans and Test Procedures	11	0	
12/30/95	Final Release IR-1 Test Plans and Test Procedures	11	0	
6/1/96	Initial Release A Test Plans and Test Procedures	11	0	
ETS CDR	ETS CDR RIDs	5	О	
+ 2 weeks				
Release A CDR	ECS Release A CDR IV&V RIDs	5	0	
+ 2 weeks				
As Completed	Release IR-1 Test Reports	11	0	

^{*} C = Completed, IP = In Process, O = Open, D = Delayed, CX = Canceled

EXHIBIT 1-3: Status of Milestones/Deliverables (Continued)

1.4 Performance Assurance Activities/Issues

- Program-level training on the larger aspects of EOSDIS is currently being planned for all IV&V team members. The intent of this training is to give all team members a broader knowledge of the program as a whole, as well as a more fundamental sense of program goals and issues.
- Training on Lotus Notes began at the end of October. This periodic training program will continue through 1/95 and will cover user training, application development training, and system administration.
- Formal training on the RTM tool to support the analysis tasks (i.e., Tasks 5 and 9) occurred in early November. Advanced training on this tool is slated for early next year. In addition, formal training on BONeS, a model simulation and test tool, is currently being planned.
- The EOSDIS IV&V Home Page is being developed to facilitate EOS community access to IV&V-related information. This Home Page will reside on the Internet

and will link users to both the IV&V library and the IV&V Issues and Discrepancy Tracking System, which is currently being developed. The Home Page will also be linked to Hughes' Electronic Data Handling System (EDHS).

1.5 Major Short Term Activities Planned

Office Operations

- Move the Greenbelt office to permanent quarters on second floor. This move is scheduled for December 16, 1994.

Communications

- Prepare for the Executive Council Meeting, scheduled for December 14, 1994. Also prepare for the Harris/Dalton Issues and Findings Working Group monthly meeting, scheduled for December 21.
- Continue developing interfaces and data access privileges between the IV&V team and Goddard, Hughes, TRW, CSC, and the Software IV&V Facility in West Virginia. Get on appropriate distribution lists.
- Continue developing IV&V Home Page as well as on-line IV&V document library and discrepancy tracking system.

• Technical Performance

- For Task 3, deliver the final versions of both the IVVMP and the ISVVP.
- For Task 4, complete a draft of the ISE System Architecture document and plan for the ISE System Architecture Review scheduled for January 13, 1994. Also, perform analysis activities associated with discrepancy tracking for the IV&V effort.
- For Task 5, analyze HAIS user and performance models (Version 1.0), and attend ECS FOS PDR and prepare RIDs.
- For Task 9, continue analysis of all IRDs nearing baselining, and conduct a peer review of the Institutional and Version 0 requirements. Also, continue to obtain user inputs on the interface analysis database tool.
- For Task 10, deliver the initial version of the EICP, and conduct an EICP briefing to NASA system management.

- For Task 12, perform engineering analysis on CUP TO 94-2 through 94-8 reports, and initiate baseline requirements analysis activities.

1.6 Key Long Range Plans/Schedules

The IV&V team will support the activities and milestones identified in Exhibit 1-2. Emphasis will be placed on those activities that are on the critical path to support the on-time launch of the spacecraft. Such activities include Key Interface and Integration Testing (KIIT) and System Certification.

2. TECHNICAL INFORMATION

2.1 Task # 3: Independent Verification and Validation Plans

a) Task Accomplishments

- Completed all updates to the IV&V Management Plan (IVVMP). The final version of this document will be delivered ahead of the planned schedule.
- Received Government comments of the draft Independent System V&V Plan (ISVVP) and are presently readying this document for final delivery.

b) Issues/Concerns

• None. This task is expected to complete on time and within budget (See Appendix 3A for summary task schedule).

c) Subcontractor Performance

 All subcontractors are reviewing the IVVMP and ISVVP to ensure consensus. In addition, CTA and EWA are providing technical inputs during the document finalization process.

d) Planned Activities

- Deliver the final version of the IVVMP before the December 16, 1994 due date.
- Deliver the final version of the ISVVP on schedule (i.e., December 16, 1994).

2.2 Task # 4: IV&V Infrastructure and Tool Development

a) Task Accomplishments

- Incorporated comments received on the ISE System Requirements document dated October 28, 1994. (An updated revision of the ISE System Requirements document is planned for the first quarter of 1995.)
- Continued analysis and design work on defining the ISE system architecture.
- Hosted internal ISE System Architecture Design Review on November 16, 1994, to obtain IV&V Task Lead approval.
- Developed a working outline for the ISE System Architecture document.

- Evaluated the PCX software package, Xoftware, by running the RTM product on a
 PC configured with a 66 Mhz Intel chip. A product such as this one will be
 necessary to allow our PC and Unix platforms to cross-communicate. The
 performance of Xoftware was considered acceptable. Further evaluation is planned
 once the Fairmont Sun server and network are properly configured.
- Currently supporting the CM plan documentation effort being headed by CSC for NASA. IV&V team involvement is essential since the plan to be generated will be levied against the EOSDIS project.
- Contacted Chris Wheeler, Gil Scott, and Mac McDonald of Hughes to discuss various tool related issues and to inquire about the Hughes tool environment. These actions have been taken in an effort to achieve parity between the tool suites of the ECS prime contractor and the IV&V contractor.
- Initiated activities associated with a discrepancy tracking and reporting system. Requested an evaluation copy of DDTs from QualTrak. (Hughes is using DDTs and is in the process of developing a Mosaic front-end to submit discrepancies and receive reports.
- Updated the Automated Requirements Database (ARDB) tool to accommodate interface requirement analysis activities. Also, continued developing a data extraction capability which will allow data retrieval from the RTM/Oracle database.
- Continued developing the Interface Analysis Database (IADB) tool using Microsoft Access. Reporting capabilities are being added.
- Continued developing the Lotus Notes Data Management application.
- Attended formal training in Lotus Notes and the Requirements Traceability Management (RTM) tool.

b) Issues/Concerns

• We need to achieve connectivity between the Greenbelt office and Goddard in order to provide robust data access / data sharing throughout the EOSDIS community. Connectivity is currently planned for early December.

c) Subcontractor Performance

• CTA's performance has been excellent. They provided valuable input during the ISE system architecture definition process; are directly responsible for the development

gains realized in the IADB tool; and admirably supported an IV&V tools demonstration given to ESDIS project personnel on November 29, 1994.

• EWA's performance has also been excellent. Their contributions include supporting system administration activities for the Fairmont facility, and providing engineering expertise on Mosaic usage and capabilities.

d) Planned Activities

- Complete a draft of the ISE System Architecture document.
- Review the revised Tool Management Plan before December 15, 1994.
- Achieve connectivity between the Lotus Notes servers in Greenbelt and Fairmont, and complete the Lotus Notes Data Management application.
- Perform analysis activities associated with developing ISE executive interfaces for both the PC and Sun platforms.
- Perform analysis activities associated with discrepancy handling and reporting for the IV&V effort.
- Attend the second level of Lotus Notes system administration training.
- Configure the GFE Sun server and X-terminals.
- Plan for the ISE System Architecture Review scheduled for January 13, 1995.
- Monitor the needs of the IV&V Task Leads and support program meetings/briefings as required.

2.3 Task # 5: Requirements Analysis and Traceability

a) Task Accomplishments

- Completed ECS technical integrity requirements analysis *peer review* of severity level-1 (minor) problems and generated change pages to the Preliminary Requirements Analysis TAR submitted on October 28, 1994 (See Appendix 5A for the change pages to this report.). Subtask 5.1 is now completed.
- Began mapping user scenarios to ECS Level 3 requirements. Reviewed and commented on the HAIS draft science user survey and the HAIS modeling plan. Also, attended AHWGP preview modeling presentation by HAIS at GSFC. Still

waiting for delivery of HAIS user and performance models (expected first week in December).

- Initiated ECS IR-1 requirements analysis effort by establishing analysis Excel/Word databases and obtaining an updated copy of HAIS ECS RTM database. Established an IV&V ECS PDR focus team consisting of a mix of Task 5, 9, and 10 personnel.
- Transitioned ETS monitoring activity to Task 13. Subtask 5.4 is therefore completed.
- Attended HAIS monthly project review and other IV&V applicable working group/focus team meetings.
- Received RTM user and system administrator training. Also attended SpaceOps '94 conference.

b) Issues/Concerns

• We need clarification on the role of IV&V in validating the HAIS cost models. If complete validation is expected, we will need more details on the cost models. We are currently discussing an appropriate course of action with the COTR.

c) Subcontractor Performance

• Subcontractor performance from CTA and SMSRC has been excellent.

d) Planned Activities

- Receive/Install/Analyze HAIS user and performance models (Version 1.0).
- Receive update to MTPE Level 1/Level 2 requirements RTM database.
- Attend AHWGP modeling presentation by HAIS.
- Prepare/Present Task 5 findings to ESDIS management at monthly meeting.
- Attend ECS FOS PDR and prepare RIDs.
- Support other program meetings and briefings as required.

2.4 Task # 9: Key Interface Analysis

a) Task Accomplishments

• TRMM Pilot Analysis

- Met with Ted Ackerson, the ESDIS TRMM Interface Manager, to preview the findings of our analysis report.
- Completed the pilot Technical Analysis Report on the ECS-TRMM IRD, Deliverable 0903.

• Version 0 Performance Analysis

- Completed all activities under this task with the October 31 delivery of the Version 0 User Assessment, Deliverable 0902.

Analysis of Other Key Interfaces

- Received Requirements Traceability Management (RTM) tool training.
- Attended the AOS Testbed Symposium as well as sessions of the SpaceOps which focused on interfaces.
- Began data flow analysis of Institutional and AM-1 IRDs.
- Began requirements review of the following IRDs: MITI/Aster; Science Computing Facility.
- Developed IRD/ICD schedule using inputs from SES and other sources.
- Attended meetings of the ECS SIT.
- Supported the November 15 meeting with the ESDIS Project to convey EOSDIS program findings.
- Began preparing for the PDR.

Tool Requirements

- Continued to obtain tool requirements for the Interface Analysis Database (IADB) from the user of the prototype.

b) Issues/Concerns

- Although we believe that the TRMM IRD provides a solid base for future ICD development, our technical integrity review identified several problems resulting from the ambiguous, incomplete, and inconsistent specification of requirements. The majority of these issues can be mitigated by using more precise terminology.
- In analyzing the interface implementation for TRMM, we noted two issues. First, the IRD did not uniformly identify the data products being carried across the system interfaces. We therefore recommend that the ESDIS Project baseline a detailed set of data definition element names, and that all interface documentation (i.e., IRDs and ICDs) adhere to these baselined definitions. Second, inconsistencies existed in the performance requirements. For example, we found that the IRD and an external document were consistent, but both documents were inconsistent with the ECS Functional and Performance Requirements (F&PR). We therefore recommend updating the F&PR.

c) Subcontractor Performance

• CTA is the task lead for this effort. Their performance has been excellent.

d) Planned Activities

• TRMM Pilot Analysis

- Use the feedback from Ted Ackerson on the TRMM IRD TAR to adjust our process and ensure that we are providing useful input to the customer.

• IRD/ICD Analysis

- Continue analysis of all IRDs nearing baselining.
- Begin to meet with each ESDIS Interface Manager.
- Conduct a peer review of the Institutional and Version 0 requirements.

Tool Requirements

- Continue to obtain user inputs on the interface analysis database tool.

Meeting Support

- Support program meetings and briefings as required.

2.5 Task # 10: Development of EOSDIS Certification Plan

a) Task Accomplishments

- Delivered the Tool Requirements Document one month ahead of schedule.
- Maintained active participation in working groups to ensure currency.
- On target to deliver the initial draft of the EOSDIS Integration and Certification Plan (EICP) on December 16, 1994.

b) Issues/Concerns

• Due to a staffing shortfall, the detailed engineering analysis expected for this task has not as yet been fully realized. We are currently interviewing candidates to correct this shortfall. See Appendix 10A for summary task schedule.

c) Subcontractor Performance

• CTA is working well under this task, providing the majority of the technical staffing. SMSRC and EWA are not directly involved.

d) Planned Activities

- Deliver the initial version of the EICP in mid-December as planned.
- Conduct an EICP briefing to NASA systems managers and others on December 21, 1994.

2.6 Task # 12: EDOS IV&V

a) Task Accomplishments

- Reviewed both the Contract Understanding Period (CUP) Task Order (TO) 94-1 and its revision, as well as SCR materials. Delivered comments to these documents on November 30, 1994.
- Generated functional and activity matrices based on the EDOS Performance Verification Plan (PVP) and the Independent System Verification and Validation Plan (ISVVP). Discussed with the Test Oversight Group (TOG) the tailoring of our IV&V approach to the EDOS environment.
- Supported the EOSDIS IV&V interface group in preparing its AM-1 test-related information, and coordinated the presentation of this information to the EDOS Project. Also, summarized AM-1 testing activities based on the preliminary test report from the AM-1 project. Currently drafting an IV&V plan in response to project direction for the early preparation of Mission Readiness Testing.
- Visited the IV&V Task 4 team at the West Virginia facility to discuss EOSDIS project commonalty and test tool issues. (Copies of the briefing materials were given to I&TM and TRW.)
- Discussed ODC-to-EDOS/Ecom interface issues with J. Johnson of the Remote Sensing Public Access Center (RSPAC) in response to BDM's request.
- Supported the EDOS Project level monthly review, as well as the SCR.

b) Issues/Concerns

• None.

c) Subcontractor Performance

• CTA supported this effort in all relevant areas.

d) Planned Activities

- Perform engineering analysis on CUP TO 94-2 through 94-8 reports.
- Initiate baseline requirements analysis and other engineering analysis activities.
- Support EDOS V&V/test activities as required by the I&TM and the Project Office.
- Support program meetings and briefings as required.

SECTION 2 APPENDICES

APPENDIX 3A

Summary Task 3 Schedule

APPENDIX 5A

Change Pages to Preliminary Requirements Analysis TAR

APPENDIX 10A

Summary Task 10 Schedule

3. FINANCIAL/CONTRACTUAL INFORMATION

Section 3 of This Report

Has Been Removed

Due to Proprietary Content.